

## REMARKS

### I. PENDING CLAIMS AND SUPPORT FOR AMENDMENTS

Upon entry of this amendment, claims 1-13 and 15-21 will be pending in this application. Applicants note that this rejection has been made after the filing of Applicant's Appeal Brief, and ask that the Examiner explain why it is necessary to reopen prosecution after Applicant has been forced to go the expense of preparation and filing of an Appeal Brief, and in particular, to explain why the new grounds of rejection were not made earlier in the prosecution of this application, so that they could have been addressed earlier, and to explain why the withdrawn rejections were not withdrawn prior to the Appeal Brief, thus saving Applicant the time and money spent addressing them therein.

### II. OBVIOUSNESS-TYPE DOUBLE PATENTING REJECTION

At page 2 of the Office action, the Examiner has rejected claims 1-13 and 15-20 on the grounds of non-statutory obviousness-type double patenting as obvious over claims 1-28 of copending published application no. 2006/0031997. Applicant respectfully traverses this rejection and requests its reconsideration and withdrawal.

Applicant encloses herewith a terminal disclaimer that obviates the double patenting rejection. Accordingly, the rejection should be withdrawn.

### III. WRITTEN DESCRIPTION REJECTION

At page 3 of the Office action, the Examiner has rejected claims 1-9, 11-13, 15, 16, and 18-20 under 35 U.S.C. § 112, first paragraph, as lacking adequate written description.

#### A. Claims 1-9, 12-13, 15, and 16

Applicant argues these claims together because they are the only rejected claims for which the issues of whether (a) the temperature range is supported by adequate written description and (b) the dissolution range is supported by adequate written description are the same.

1. The temperature range recited in claim 1 is fully supported by the specification as filed.

Claim 1 recites that the nylon-containing material is contacted with the alkanol-containing solvent at an elevated temperature below 155 °C. The Examiner asserts that this limitation is not supported by adequate written description in the specification. Applicant's specification clearly states that the "use of increased pressure allows operation at temperatures below 160 °C" referring to the dissolution temperature. This is disclosed in the specification at page 5, lines 10-11, and at page 6, lines 27-28.

Inexplicably, the Examiner has taken the position that a claim limitation that recited dissolution temperatures below 160 °C would be supported by adequate written description, but that this somehow refers not to any temperature below 160 °C, but rather to only the range "about 130 °C to about 155 °C." *See* Office action, page 3, lines 17-19. The Examiner provides no basis for this interpretation, and cites no case law supporting the proposition that a broad range should be interpreted as limited to a disclosed narrower or preferred subrange within it. Applicant is sure that this rule will come as quite a surprise to most practitioners, as well as the Federal Circuit, since it is not the law.

Applicant's specification also discloses dissolution temperatures of 155 °C (specification at page 5, line 8; page 7, Samples 5, 6; page 8, Samples 1A, 1B, 2A, and 2B); 150 °C (specification at page 7, Sample 7); 147 °C (specification at page 9, Sample 3); 145 °C (specification at page 5, line 9 and page 7, Sample 8); 143 °C (specification at page 9, Samples 1, 2); and 130 °C (specification at page 5, line 8). Applicant has therefore disclosed not only the range "below 160 °C," but also a number of different specific temperatures within that range, including 155 °C.

The correct standard for assessing the adequacy of the written description provided by the original disclosure for amended claim language is whether the disclosure as filed reasonably conveys that the inventor had possession of the later claimed subject matter as of the filing date of the application. *See In re Kaslow*, 217 USPQ 1089 (Fed. Cir. 1983). The Examiner appears to instead apply an "*ipsissimus verbis*" standard, requiring that the exact words used in the claim be present (as evidenced by the Examiner's statement that only the range 130 °C to 155 °C is supported by the specification). The Examiner appears to take the position that Applicant must show a separate example, or have a separate disclosure of each temperature less than 155 °C, stating:

Also, temperature of 150 °C, 147 °C, 145 °C, 143 °C and 130 °C do not support the recited below 155 °C which includes 154.5 °C or 152 °C for example.

*See* Office action, page 3, lines 22-24.

Applicant notes that the situation here is directly analogous to that at issue in *In re Wertheim*, 191 USPQ 90 (CCPA 1976). In that case, the written description issue was whether, for a process invention, the disclosure in a prior application of a

broad range of solids content from 25% to 60%, along with specific embodiments of solids contents of 36% and 50%, would provide adequate written description for a claimed range of 35% to 60%. The court found the disclosed range to be adequate written description for the claimed range. Similarly, *Wertheim* held that an added claim limitation to a particle size of at least 0.25 mm was supported by a specification that described that the particles may, for example be ground to a particle size preferably within the range of 0.25 to 2.0 mm (reversing the Patent and Trademark Office position that only the range 0.25 mm to 2.0 mm was supported). *Wertheim*, 191 USPQ at 99. *See also Synthetic Industries (Texas), Inc. v. Forta Fibre Inc.*, 224 USPQ 955, 961 (W.D. Pa. 1984).

In this application, Applicant has clearly disclosed possession of the range “below 160 °C” as of his filing date. The specification is unambiguous about this. The specification is also unambiguous that 155°C is an alternative upper limit for the dissolution temperature range. As in *Wertheim*, the disclosure of a possible lower limit that provides a narrower range does not function to negate the support in Applicant’s specification for the range “below 160 °C,” including the range “below 155 °C.” To the contrary, the disclosure of specific dissolution temperatures below 155 °C, coupled with the disclosure of a dissolution range “below 160 °C,” would lead those skilled in the art to conclude that the range of dissolution temperatures “below 155 °C” was a part of Applicant’s invention, and in Applicant’s possession as of the filing date of this application. As in *Wertheim*, the Examiner has “done nothing more than to argue lack of literal support, which is not enough.” *Wertheim*, 191 USPQ at 98. Because the Examiner has failed to establish that the claims lack adequate written

description in the specification, the Examiner's rejection of claims 1-9, 15, and 16 on this basis is erroneous and should be reversed.

Although these arguments were presented in Applicant's Appeal Brief, the Examiner has failed to address them in the Office action. Applicant requests that the Examiner either explain why the *Wertheim* and *Synthetic Industries* cases are inapplicable, or follow the dictates of the law embodied in them and withdraw the rejection.

2. The dissolution time range recited in claim 1 is fully supported by the specification as filed.

Again, the relevant issue is whether the disclosure describes the range of dissolution times sufficiently clearly that one having skill in the art would recognize from the disclosure that Applicant invented the claimed range. *See In re Herschler*, 200 USPQ 711, 717 (CCPA 1979); *In re Smythe*, 178 USPQ 279 (CCPA 1973). As described above, the specification discloses a maximum dissolution time of 45 minutes, and exemplifies four additional dissolution times that are less than 45 minutes.

The situation presented by the present facts is directly analogous to that presented in *In re Eickmeyer*, 202 USPQ 655, 662 (CCPA 1979). In that case, the appellant was claiming a process involving a step of contacting "at an elevated temperature of at least about 56 °C." *Eickmeyer*, 202 USPQ at 658. The appellant's specification contained "replicate tests of the operation of his process at 56 °C" and also at 80 °C, and the court found that it would have been clear to one skilled in the art that appellant considered his hot system to operate at temperatures of at least about

56 °C. *Eickmeyer*, 202 USPQ at 662. In holding that rejections for insufficient enablement were erroneous, and that the above-quoted claim language was supported by the specification, the court stated:

Although appellant may be entitled to claim a range of temperatures below 56 °C, he need not claim all that he is entitled to claim and need have support only for what he does claim. We are not persuaded that there is any requirement for appellant to demonstrate the *criticality* of a lower limit to meet the description requirement.

*Eickmeyer*, 202 USPQ 662-663 (emphasis in original).

In this case, Applicant has disclosed a dissolution time of 45 minutes. He has also disclosed several dissolution times less than this time. Under the rationale of *Eickmeyer*, it would have been clear to one skilled in the art that Applicant considered his process to operate at dissolution times less than 45 minutes. Applicant is not required to show any criticality for this upper limit, but is merely required to establish its presence in the specification.

For at least the reasons given above, the rejection made by the Examiner that claims 1-9, 15, and 16 are not supported by adequate written description is erroneous and should be reversed. Again, these issues were raised by Applicant in the Appeal Brief, but have not been addressed by the Examiner in the Office action. Applicant requests that the Examiner either explain why the *Eickmeyer* case is not applicable, or follow its dictates and withdraw this rejection. Moreover, the Examiner has not explained, using either facts within his own knowledge and supported by a declaration under 37 C.F.R. § 1.104(d)(2), or citing a reference teaching, or even a scientific theory, why it is that any of the time periods encompassed by Applicant's

claims will not work. To the contrary, the Examiner's rejection contradicts his later, facile conclusion that:

Even the use of a pressure vessel in order to shorten (cooking) time is well known to person without a knowledge of chemistry such as cooks and house wives, and a pressure cooker (vessel) found in kitchen of a home yields a faster cooking than a regular cooker or pot.

See Office action, page 7, lines 4-7.

B. Claim 11

Applicant argues claim 11 (an originally presented claim) separately because it recites a temperature that is (a) within the range that the Examiner admits on the record to be supported, (b) is explicitly and clearly supported by the specification at page 5, line 9, and (c) is an originally presented claim. See *In re Gardner*, 177 USPQ 396 (CCPA 1973) (Original claims are part of disclosure, and claims equivalent in scope satisfy written description requirement, without more). The Examiner's rejection of claim 11 for inadequate written description is therefore erroneous and should be reversed, irrespective of the Examiner's views about the exactness of the science of thermometry (which are, in any case, incorrect, since the accuracy of a temperature measurement is limited by the inherent accuracy of the device measuring it). The issue of whether the limitation on dissolution time is supported by adequate written description is addressed above with respect to claims 1-9, 15, and 16.

C. Claim 18

Applicant argues claim 18 separately because it recites an upper limit on dissolution time (37 minutes) that is different from that of claim 1 (45 minutes). As explained in *Eickmeyer*, it is not required that Applicant claim the full range of

dissolution times to which he is entitled, or to demonstrate any criticality for the claimed upper limit should he choose not to do so. In this case, Applicant has chosen to claim the range of dissolution times below 37 minutes, which is clearly supported in the specification at page 9, Run 1. For this reason, the Examiner's rejection of claim 18 for inadequate written description is erroneous and should be reversed.

The issue of whether the limitation on temperature is supported by adequate written description is addressed above with respect to claims 1-9, 15, and 16.

D. Claim 19

Applicant argues claim 19 separately because it recites an upper limit on dissolution time (23 minutes) that is different from that of claim 1 (45 minutes) or claim 18 (37 minutes). As with claim 18, it is not required that Applicant claim the full range of dissolution times to which he is entitled, or to demonstrate any criticality for the claimed upper limit should he choose not to do so. In this case, Applicant has chosen to claim the range of dissolution times below 23 minutes, which is clearly supported in the specification at page 9, Runs 2 and 3. For this reason, the Examiner's rejection of claim 19 for inadequate written description is erroneous and should be reversed.

The issue of whether the limitation on temperature is supported by adequate written description is addressed above with respect to claims 1-9, 15, and 16.

E. Claim 20

Applicant argues claim 20 separately because it recites an upper limit on dissolution time (15 minutes) that is different from that of claim 1 (45 minutes), claim 18 (37 minutes), or claim 19 (23 minutes). As with claims 18 and 19, it is not



required that Applicant claim the full range of dissolution times to which he is entitled, or to demonstrate any criticality for the claimed upper limit should he choose not to do so. In this case, Applicant has chosen to claim the range of dissolution times below 15 minutes, which is clearly supported in the specification at page 9, Run 4. For this reason, the Examiner's rejection of claim 20 for inadequate written description is erroneous and should be reversed.

The issue of whether the limitation on temperature is supported by adequate written description is addressed above with respect to claims 1-9, 15, and 16.

F. Claim 21

Applicant argues claim 21 separately because it recites lower limits on temperature and recites an upper limit on the dissolution time (45 minutes) that the Examiner agrees is supported by an adequate written description. Claim 21 also recites that the dissolution time is sufficient to dissolve the desired yield of nylon, and is therefore not subject to the erroneous rejections made with respect to claims 1-9, 11-13, 15, 16, and 18-20. Support for the dissolution time being the time necessary to dissolve the desired yield of nylon can be found in the specification at page 5, lines 8-11.

#### IV. ENABLEMENT REJECTIONS

##### A. Dissolution Time

At page 4 of the Office action, the Examiner has rejected claims 1-13 and 15-20 under 35 U.S.C. § 112, first paragraph, as being beyond the scope of the enablement provided by the specification. Applicant respectfully traverses this rejection and requests its reconsideration and withdrawal.

The Examiner asserts that:

the specification, while being enabling for the dissolution temperature [sic, time] of 45, 37, 23, and 15 minutes, does not reasonably provide enablement for the dissolution temperature [sic, time] of 45, 37, 23 and 15 minutes or less. . . . As discussed above, the recited 15 minutes or less encompasses 30 seconds for example, and applicant failed to show that said 30 seconds enable the invention.

See Office action at page 4, lines 11-17.

Fortunately, in making a rejection for lack of enablement, the burden is on the Examiner to establish, either through evidence or scientific reasoning, that the dissolution cannot be carried out in time periods below 15 minutes. See *In re Marzocchi*, 169 USPQ 367 (CCPA 1971); *In re Dinh-Nguyen*, 181 USPQ 46 (CCPA 1974). The Examiner has completely failed to do this: the sum total of his reasoning is that there is not an example or specific disclosure for every possible dissolution time within the range claimed by Applicant. Moreover, even if the claims can arguably be construed to read on some inoperative embodiment (for example, by selecting a dissolution time of a picosecond), this does not mean that the claims are not enabled for the full range of dissolution times claimed. See *In re Cook*, 169 USPQ 298 (CCPA 1971).

This is particularly true for claim 21, which recites that the dissolution time is sufficient to dissolve the desired yield of nylon. Applicant's specification clearly explains how to do this for a variety of temperatures, pressures and dissolution times, and one of skill in the art, upon reading about the relationship between pressure, temperature, and dissolution time described at page 5, lines 22-28, would understand how to vary the dissolution time for a given yield by selection of temperature and pressure within the recited ranges.

**B. Solvent Composition**

At pages 4-5 of the Office action, the Examiner has rejected claims 1-13 and 15-20 under 35 U.S.C. § 112, first paragraph, as being beyond the scope of the enablement provided by the specification. Applicant respectfully traverses this rejection and requests its reconsideration and withdrawal.

The Examiner asserts that:

[T]he specification, while being enabling for the composition having a solvent concentration of 80%, does not reasonably provide enablement for the composition without any amount. . . .

Note that the dissolution time is dependent on the amount of nylon in a solvent, and the examples of the specification use 80% concentration of a solvent. Applicant failed to show that a composition comprising 10% of solvent and 90% of nylon would yield dissolved nylon at a temperature of 130 °C and a dissolution time of 30 seconds or 15 minutes, for example. Claims 7 and 8 do not recite amounts of solvent in the composition, but the amount of alkanol (ethanol) in water or solvent.

See the Office action at page 4, lines 19-20; page 5, line 1 and lines 4-9.

There are a number of problems with the Examiner's rejection that render it completely improper and inappropriate. First, nowhere does the specification disclose that the relative amounts of nylon and solvent are critical operating parameters.

Moreover, the Examiner neither provides a reference nor a declaration under 37 C.F.R. § 104(d)(2) establishing that this is the case. In fact, the relative amounts of nylon and solvent can be widely varied by one having ordinary skill in this art, without the need for routine experimentation. The important feature of the claimed invention is that the dissolution pressure is maintained at a sufficiently high level (above the equilibrium vapor pressure of the solvent at the dissolution temperature) that the dissolution can be conducted at low temperature, without loss of fiber properties. It is thus not necessary for Applicant to provide the Examiner with an example to each and every possible solvent/nylon concentration to satisfy his idiosyncratic concerns about enablement. *See Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 231 USPQ 81 (CAFC ) (A patent need not teach, and preferably omits, that which is well known in the art). It is precisely this kind of burdensome requirement that the courts have held improper in cases such as *Marzocchi* and *Dinh-Nguyen*, cited above, as well as in cases such as *In re Armbruster*, 185 USPQ 152 (CCPA 1975); *In re Bowen*, 181 USPQ 48 (CCPA 1974); *In re Robins*, 166 USPQ 552 (CCPA 1970); and *In re Strahilevitz*, 212 USPQ 561 (CCPA 1982), among many others that could be cited here. Not only does the Examiner, without any support, logical reasoning, or scientific explanation, assert that Applicant must provide an example for every possible solvent/nylon concentration, he appears to assert that Applicant must provide an example for every possible combination of solvent/nylon concentration, dissolution temperature, and dissolution time, as indicated in the portion of the Office action quoted above. This position is completely without any

legal support, and is untenable. The Examiner's attention is particularly drawn to the *Strahilevitz* case cited above, which clearly rejects the Examiner's position.

The Examiner has not set forth any explanation as to why he believes that solvent/nylon combinations other than 80% would not work, because there is no explanation. In fact, other combinations do work as a careful reading of Example 3 in Applicant's specification indicates. In that Example, enough solvent is added to nylon to form a 3.5 wt% mixture of solvent and nylon. Thus, other amounts of solvent and nylon combinations have been shown to work, and one of even minimal skill in this art would be readily able to determine other combinations that work, simply by following Applicant's teachings on temperature and pressure, and conducting no more than routine experimentation.

Moreover, even if the Examiner were able to persuasively argue that a particular solvent/nylon concentration did not work, this does not mean that the claims are not enabled. It is not a function of the claims to exclude every possible inoperative embodiment. *See In re Cook*, 169 USPQ 298 (CCPA 1971); *In re Smythe*, 178 USPQ 279 ( ); *In re Angstadt*, 190 USPQ 214 ( ).

Applicant respectfully submits that the Examiner's allegations that the specification is not enabling for any solvent/nylon combination other than 80% is incorrect as a matter of fact and as a matter of law, and as a result, the Examiner's rejection should be withdrawn.

V. REJECTIONS OVER YANG ET AL.

A. Rejections Under 35 U.S.C. § 102(e)/103(a)

At pages 6-7 of the Office action, the Examiner has rejected claims 1-12 and 15-20 as anticipated under 35 U.S.C. § 102(e) or in the alternative as obvious under 35 U.S.C. § 103(a) over Yang et al. (U.S. Patent No. 6,036,726). Applicant respectfully traverses this rejection and requests reconsideration and withdrawal thereof.

1. Anticipation Rejection

The Examiner states:

The examiner points out that the overlapping range such as temperature and dissolution time is anticipation. The preferred temperature of 140-220 °C on col. 7, line 1 and claim 3 encompasses the instant temperature. See *In re Mills*, 477 F.2d 649, 176 USPQ 196 (CCPA 1972). Reference must be considered for all that is discloses and must not be limited to preferred embodiments or working examples.

See Office action at page 6, lines 19-23.

First, the Examiner's reliance on *Mills* is misplaced. The *Mills* decision concerned an obviousness rejection, not an anticipation rejection. *Mills* therefore does not stand for the proposition that the Examiner can cobble together ranges from different parts of the Yang et al. reference and call that anticipation, as the Examiner has done here.

Second, the relevant analysis is that provided in Applicant's Appeal Brief. The Office action of July 15, 2004, which the Examiner has incorporated by reference, states:

The prior art of Yang discloses process for recycling of nylon-6,6 articles such as carpets, which articles contain dyes.

According to claim 27 of the prior art of Yang, the process includes the steps of contacting the polyamide with organic solvent at a temperature sufficient to dissolve the polyamide, separating the undissolved carpet materials and colorant, cooling the polyamide solution thereby causing precipitation.

According to the claims of the prior art of Yang, the temperature at which polyamide is dissolved is in a range of 140-220 °C and the precipitation occurs by cooling the polyamide solution to temperature lower than 140 °C. In specific examples, the dissolution temperatures were 140 °C, 160 °C and 180°C (col. 13) at a pressure of 250 psig. Temperature range of 140-155 °C is therefore taught by the prior art of YANG.

In the examples the prior art of Yang utilizes solvent system, which is a mixture of alcohol and water. The alcohols include methanol, ethanol, isopropanol and butanol. . . . Since the solvent of the prior art of YANG is the same type of solvent as it is disclosed in present claims, the temperature range overlaps and the type of nylon is the same, then the equilibrium pressure would be an inherent property, which is the property of a solvent.

Rejection dated July 15, 2004, pages 2-3.

- a. Yang et al. does not disclose an embodiment containing every element of the claims under review, arranged as in the claims under review

For anticipation to occur, every element of the claim must be identically shown in a single reference. *See, e.g., Diversitech Corp. v. Century Steps, Inc.*, 7 USPQ2d 1315, 1317 (Fed. Cir. 1988). In addition, these elements must be arranged as in the claim under review. *See, e.g., In re Bond*, 15 USPQ2d 1566, 1567 (Fed. Cir. 1990). The treatment by a district court of a claim as a mere catalog of separate parts, disregarding the relationship between the parts set forth in the claims was found to have lead to an erroneous conclusion of anticipation in *Lindemann Maschinenfabrick GMBH v. American Hoist and Derrick Co.*, 221 USPQ 481, 486 (Fed. Cir. 1984). More specifically, an anticipation rejection under 35 U.S.C. § 102 is only proper

where the asserted reference clearly and unequivocally discloses the claimed invention without any need for picking, choosing, and combining various disclosures within the cited reference. *See In re Arkley*, 172 USPQ 524, 526 (CCPA 1972).

In this application, Applicant has claimed, in claim 1, a process for recovering nylon by contacting the nylon with an alkanol-containing solvent at an increased pressure (i.e., at a pressure above the equilibrium vapor pressure of the solvent at the dissolution temperature). This increase in dissolution pressure allows the dissolution step to be conducted at a significantly lower temperature (i.e., below 155 °C), while still retaining a relatively short dissolution time (i.e., 45 minutes or less). It is this combination and arrangement of specific ranges for three process parameters that is unrecognized and undisclosed in Yang et al.

Yang et al. disclose a method for decolorizing a solid polyamide by (a) contacting it with an organic solvent composition at a temperature effective to dissolve the polyamide, forming a solution of the colorant and the dissolved polyamide, and (b) separating the colorant from the polyamide. *See Yang et al.*, col. 2, lines 6-13. The dissolution temperature is broadly disclosed to be between 140 °C and 220 °C, “preferably about 160 °C – 180 °C.” Yang et al., col. 2, lines 35-38.

However, Yang et al. do not disclose using a pressure that is above the equilibrium vapor pressure of the solvent at the dissolution temperature. The Examiner states that Yang et al. disclose a dissolution pressure of 250 psig, giving the erroneous impression that the same pressure is used for every temperature in the recited temperature range. This is not the case, however. Yang et al. disclose a very broad pressure range “between about atmospheric and about 300 psig, preferably



between about atmospheric pressure and 250 psig.” Yang et al., col. 7, lines 2-4. The reason such a broad range is necessary is that Yang et al. disclose a wide variety of different dissolution solvents and a wide range of dissolution temperatures, rather than any suggestion that a dissolution pressure above the equilibrium vapor pressure of the solvent at that temperature should be used. To the contrary, Yang et al. explicitly state:

The pressure at which the solvating step is carried out will depend upon the solvent since the pressure is the result of the solvent vapor pressure.

Yang et al., col. 6, lines 56-58 (emphasis added).

Yang et al. make brief mention that “[e]levated pressure may be that provided by an inert gas, such as nitrogen or argon, or it may be vapor pressure generated by vaporization of dissolution liquids (i.e., solvent vapor pressure). See Yang et al., col. 7, lines 4-8. However, there is no explanation in Yang et al. as to how or why this could or should be done. Yang et al. certainly does not disclose that an inert gas should be used to increase the dissolution pressure above the vapor pressure of the solvent system, that this should be combined with a lowering of the dissolution temperature to below 155 °C, or that doing so would continue to allow the use of short dissolution times. To the contrary, the specific disclosures of Yang et al. clearly suggest using higher dissolution temperatures around or above 160 °C. Yang et al. specifically disclose dissolution temperatures of 170 °C (col. 7, lines 18-19), 160 °C (col. 9, lines 22-23; col. 10, lines 5-6; col. 10, lines 34-35), 159 – 171 °C (col. 11, line 1; col. 11, line 62), 160 – 180 °C (col. 13, lines 10-56). The only example in Yang et al. that discloses a dissolution temperature range anywhere close to Appellant’s is

Example 10, which does not use external pressurization, uses the equilibrium vapor pressure of the solvent system to pressurize the autoclave, and uses a dissolution time greater than 45 minutes.

Applicant submits that the Examiner has failed to apply the proper standard for determining anticipation under the precedent cited above. The Examiner does not point to a specific embodiment of Yang et al. that contains every element of Appellant's claims, arranged as in the claims without the need to pick and choose from among widely varying ranges for Appellant's recited process parameters. Instead, the Examiner presented the following instructive chart:

	Present invention	Prior art	
Temperature	<155°C	140-160°C	encompassed
Dissolution time	<45 minutes	0.5-60 minutes	encompassed
Polymer	nylon-6,6	nylon-6,6	encompassed
Source of polymer	floor covering material	carpet	encompassed
Solvent	Alkanol	Alkanol	encompassed
Restr. On solvents	Alkanol and water	Alkanol and water	encompassed
Restr on solvents	ethanol, propanol, etc.	ethanol, propanol, etc.	encompassed
Restriction	free of glycols	no glycols	encompassed
Pressure	250 psi or higher	250 psi	encompassed
Equilibrium pressure	Inherent, since it is solvent and temperature dependent		

Office action dated July 15, 2004, pages 7-8. The chart is self-serving and inaccurate in places (as examples, Applicant's broadest claims do not recite a numerical lower limit for pressure, and Yang et al. disclose the use of glycol solvents at col. 2, lines 52-60 and col. 12, line 13, rather than exclude them). Nevertheless, the chart is

indicative of the legal standard applied by the Examiner in reaching the conclusion that the claims are anticipated. For example, the Examiner takes the position that, because the claimed upper dissolution temperature limit of 155 °C is “encompassed” by the range disclosed in Yang et al., it is anticipated. Because the claimed upper limit on dissolution time of 45 minutes is “encompassed” by the range disclosed in Yang et al., it is anticipated. When Applicant asked the previous Examiner to cite any case law of which she was aware that supported such a proposition, the Examiner’s response was that she was “not obligated to cite any case laws.” Office action dated July 15, 2004, page 9.

More telling is the Examiner’s statement regarding equilibrium pressure: the Examiner apparently agrees that the equilibrium vapor pressure is a property of the solvent system used in the dissolution process. Basic thermodynamics makes clear that it is also a property of the particular dissolution temperature. As the Examiner indicates, at a particular dissolution temperature, the equilibrium vapor pressure of a particular dissolution solvent is fixed. In an enclosed vessel, at the dissolution temperature, the pressure will reach this equilibrium vapor pressure and go no higher. Applicant’s claimed process requires increasing the dissolution pressure above this pressure (e.g., by introducing an inert gas, or increasing the pressure head on the solvent system). Nowhere does Yang et al. suggest doing so in connection with using a dissolution temperature below 155 °C and a dissolution time of less than 45 minutes.

In effect, the Examiner has treated Applicant’s claims as a mere catalog of separate process steps, which the Examiner attempts to find by picking and choosing from among the various disclosures of Yang et al., and then asserting anticipation.

The Examiner has thus used a standard for determining anticipation that is precluded by the cases cited. When the proper standard for anticipation is applied, it is clear that Yang et al. does not disclose the combination of (1) a dissolution temperature below 155 °C, (2) a dissolution pressure greater than the equilibrium vapor pressure of the dissolution solvent at the dissolution temperature, and (3) a dissolution time of less than 45 minutes. To the contrary, the specific disclosure of Yang et al. cited above makes very clear that, for an alkanol-based solvent system, much higher dissolution temperatures were thought to be needed to obtain acceptable dissolution times. For at least these reasons, the Examiner's anticipation rejection is erroneous and should be reversed.

b. Yang et al. is not enabling for the invention claimed by Appellant

For the Yang et al. patent to be available as an anticipatory reference against Applicant's claims, it must enable a worker skilled in the art to make and use the invention described in those claims. *See, e.g., Akzo N.V. v. U.S. Int'l Trade Comm'n*, 1 USPQ2d 1241 (Fed. Cir. 1986), *cert. denied*, 482 U.S. 909 (1987) (The prior art reference must be enabling, thus placing the allegedly disclosed matter in the possession of the public.); *Chester v. Miller*, 15 USPQ2d 1333 (Fed. Cir. 1990) (To be prior art under section 102(b), the reference must put the anticipating subject matter at issue into the possession of the public through an enabling disclosure.)

Yang et al. does not provide one skilled in the art with an enabling disclosure for the process claimed by Applicant. Nowhere does Yang et al. recognize that, by using an elevated pressure above that of the equilibrium vapor pressure of the solvent

at the dissolution temperature, a lower dissolution temperature can be used, while maintaining a short dissolution time. Yang et al., therefore, does not teach one skilled in the art how to achieve such a result.

Claim 4 recites that the alkanol-containing solvent is substantially free of glycols or other polyols. Appellant argues this claim separately because Yang et al. fails to explicitly teach such a limitation.

The Examiner stated, with respect to Yang et al., that:

There is no teaching of glycols and polyols being used. In fact the prior art of Yang teaches that a glycol was not a good solvent for the nylon-6,6 (col. 12, example 10).

Office action dated July 15, 2004, p. 3. However, what Yang et al. actually state is that:

In this study, ethylene glycol was not a good solvent for nylon 6,6 under the conditions employed. The same was true for glycerol in a subsequent study. It appears that the greater the number of hydroxyl groups on the solvent molecule, the less effective the solvent is in the present process.

Yang et al., column 12, lines 58-64 (emphasis added).

First, whether the disclosure quoted above would dissuade one of ordinary skill from using ethylene glycol as a solvent is questionable, at best. A review of the data in Table 4 (the study referred to in the quote) shows that Sample No. 25 (n-butanol/water) and Sample No. 20 (ethylene glycol/water) dissolved the same amount of fiber (6.98%). Sample No. 27 (n-butanol/water) and Sample No. 30 (ethylene glycol/water) also dissolved the same amount of fiber (11.11%). No test results for ethylene glycol are reported in the table that are analogous to Sample No. 28.

Therefore, where results for ethylene glycol are reported, they are the same as for n-butanol. Moreover, Yang et al. specifically discloses the use of diol solvents and their combination with alcohols at column 2, lines 52-60. More disclosure of the use of diols as suitable solvents occurs at column 6, lines 44-48. This hardly seems tantamount to a disclosure that the alkanol-containing solvent should be substantially free of glycols or other polyols, as recited in claim 4. For this reason, as well as those given above with respect to claims 1-3, 5-11, 15, and 16, Appellant respectfully submits that Yang et al. fails to anticipate claim 4, and that this rejection should be reversed.

Claim 13 recites that the pressure higher than the equilibrium vapor pressure of the alkanol-containing solvent results from the pressure head of the solvent entering the reactor. The Examiner does not identify anyplace in Yang et al. where such a technique is disclosed. Moreover, a review of Yang et al. indicates that such a disclosure is simply not present. Accordingly, for this reason, as well as those given above with respect to claims 1-3, 5-11, 15, and 16, Appellant respectfully submits that the anticipation rejection of claim 13 is erroneous and should be reversed.

Claim 18 recites that the dissolution time is 37 minutes or less. The Examiner has stated:

The time in which YANG achieves dissolution is in a range of 0.5-60 minutes more preferably in a range of 0.5-20 minutes (col. 7, lines 14-16).

Office action dated July 15, 2004, p. 3. As pointed out above, however, Yang et al. does not disclose an embodiment of their process wherein a dissolution time of less

than 37 minutes is combined with a dissolution temperature of below 155 °C and a dissolution pressure above the equilibrium vapor pressure of the solvent at the dissolution temperature. A proper reading of claim 18, incorporating all of the limitations of the claim from which it depends (claim 1) requires that each of these elements be present, arranged as in the claim, in Yang et al. before a rejection for anticipation is proper. Appellant respectfully submits that this is not the case. As a result, the Examiner's anticipation rejection is erroneous and should be reversed.

Claim 19 recites that the dissolution time is 23 minutes or less. As with claim 18, Yang et al. does not disclose an embodiment of their process wherein a dissolution time of less than 23 minutes is combined with a dissolution temperature of below 155 °C and a dissolution pressure above the equilibrium vapor pressure of the solvent at the dissolution temperature. A proper reading of claim 19, incorporating all of the limitations of the claims from which it depends (claims 1 and 18) requires that each of these elements be present, arranged as in the claim, in Yang et al. before anticipation can exist. Since they are not so present in Yang et al., Appellant respectfully submits that this rejection is erroneous and should be reversed.

Claim 20 recites that the dissolution time is 15 minutes or less. Because Yang et al. does not disclose an embodiment of their process wherein a dissolution time of less than 15 minutes is combined with a dissolution temperature of below 155 °C and a dissolution pressure above the equilibrium vapor pressure of the solvent at the dissolution temperature, this rejection is erroneous and should be reversed.

The Examiner has failed to address any of this analysis with respect to anticipation, except to cite to *Mills*. While it may be true that all parts of a reference

may be available to attempt to combine with other reference teachings in an obviousness rejection, as was attempted in *Mills*, this is not the case for anticipation. Unless the Examiner can show how the analysis above is an incorrect description of the relevant law, or an incorrect application of the law to the facts of this case, he should withdraw the anticipation rejection.

## 2. Obviousness

Because of the manner in which the Examiner has structured his rejections, it is difficult for Applicant to understand whether the Examiner's comments on pressure apply to his obviousness rejection or to his anticipation rejection. Because anticipation is so clearly not present, Applicant addresses the Examiner's contentions on pressure with respect to the obviousness rejection of claims 1-12 and 15-20.

The Examiner states that:

It is well known in chemistry that a higher pressure would yield a faster dissolution of a polymer such as nylon in a solvent, and that a pressure vessel found in a laboratory or plant inherently yields a pressure higher than the equilibrium vapor pressure of a solvent, otherwise it would not be called a pressure vessel.

See the Office action at page 6, line 29 to page 7, line 4. Applicant finds this statement very interesting. It is well known in chemistry that a vessel is called a "pressure vessel" because it is capable of withstanding pressure different from ambient pressure. The term "pressure vessel" does not indicate that high pressure is necessarily being used in the process, and it says nothing whatsoever about the relationship of the pressure being used to the equilibrium solvent pressure of the material in the vessel. A pressure vessel could just as easily be used to contain



material under vacuum, or material at a pressure higher than ambient atmospheric pressure.

The statement in Yang et al. that the vessel used is a "pressure vessel" therefore merely indicates that the dissolution is carried out at a pressure higher than atmospheric pressure; unless the Examiner has some reference to cite or has personal knowledge of the Yang et al. process that he would like to make of record in a declaration under 37 C.F.R. § 104(d)(2), no conclusions whatsoever about the relationship between the dissolution pressure and the equilibrium solvent vapor pressure at the dissolution temperature can be drawn from Yang et al.

The Examiner goes on to justify his obviousness rejection over Yang et al. by stating:

Even the use of a pressure vessel in order to shorten (cooking) time is well known to person without a knowledge of chemistry such as cooks and house wives, and a pressure cooker (vessel) found in kitchen of a home yields a faster cooking than a regular cooker or pot.

See the Office action at page 7, lines 4-7. Without taking a position on whether it is possible for chemists to also be cooks and house wives, or for cooks and house wives to have studied and understood chemistry, Applicant submits that most cooking involves denaturing of proteins, not dissolution of nylon from carpet fibers. Pressure cookers work by trapping steam (given off by the food or from added water) in the cooker, increasing the boiling point of the usually liquid material put into the cooker, allowing the food to be heated to higher temperatures without boiling. In other words, at higher temperatures, proteins denature faster. This has nothing to do with dissolution of nylon from carpet fibers, and the Examiner has not shown that

increased pressure, as a general proposition, shortens dissolution times and lowers dissolution temperatures. Again, if the Examiner wishes to make the knowledge of cooks and house wives of record, he should cite a reference or file a declaration under 37 C.F.R. § 1.107(d)(2). However, as pointed out above, cooking food and dissolving nylon are completely different art areas, and knowledge with regard to one does not automatically apply to the other.

The Examiner also states that:

Yang et al. teach that one object of the invention is to avoid any substantial degradation of the polymer during the solvating step at col. 8, lines 54-56 which is the same as that of the instant invention (Field of Invention). Thus, the use a the instant higher pressure in Yang et al. is well warranted.

See the Office action at page 7, lines 7-10. Applicant submits that the Examiner has applied circular reasoning here. Yang et al. is completely silent as to the combination of high pressure, low temperature and short dissolution time that Applicant is claiming. When Applicant points out that this combination gives excellent retention of polymer molecular weight and actually improves fiber properties, the Examiner turns to the stated goal of Yang et al. and concludes that, since Yang et al. want to avoid degradation, they must have achieved this goal, and since Applicant has shown that he achieved this goal, Yang et al. must use the same conditions identified and claimed by Applicant.

Any polymer recovery process involving dissolution (rather than decomposition and repolymerization) will have as its goal the avoidance of polymer degradation. Not every process achieves this goal. If Yang et al. had discovered that the combination of high dissolution pressure, low dissolution temperature, and short

dissolution time achieved its goals, then why did they not specifically disclose that, or even suggest that such a combination could achieve those goals? In fact, Yang et al. did not realize that this particular combination of parameters yielded the polymer properties found by Applicant, and it was not until Applicant's discovery and disclosure of the same that this particular combination of parameters became known. The complete failure of Yang et al. to teach or suggest the claimed combination of parameters, and the failure of the Examiner to suggest a reasonable motivation for one of ordinary skill in the art to adopt the claimed combination constitutes a failure to establish a *prima facie* case of obviousness, and for this reason alone, the Examiner's obviousness rejection should be withdrawn.

The Examiner's comments at page 7, lines 7-10 of the Office action appear to be an indirect and superficial treatment of the Declaration of Donald Lees, submitted on March 11, 2005, and of record in this application. The Lees declaration evaluates the nylon obtained from carrying out the process of Appellant's claims, namely by heating a mixture of ethanol and sheared nylon 6,6 from carpet waste at a temperature between 138 °C and 143°C (below 155 °C) a pressures between 425 psig and 460 psig (above the equilibrium vapor pressure of ethanol at the dissolution temperatures, which is about 113 °C) in a coiled tube heat exchanger for a dissolution time of less than 45 minutes. The resulting solution was strained to remove undissolved solids and flashed in a crystallizer to a temperature of between 115 °C and 125 °C. The resulting nylon was separated, dried, and extruded to form nylon fiber. The tenacity of the resulting fiber was tested, and unexpectedly found to be above that of the tenacity for nylon fiber extruded from virgin (unrecycled) nylon. The resulting fiber

was spun into yarn and incorporated into carpet, whose properties were also evaluated. This evaluation indicated that nylon produced according to Appellant's claims was suitable for forming into fiber for use in carpet.

This suitability was unexpected because one of ordinary skill in the art would have expected significant degradation of the molecular weight of the nylon as the result of its prior use, as well as from the dissolution and recovery process. None of the prior art cited by the Examiner teaches or suggests that a dissolution/recycling process can produce nylon with a molecular weight that is at the upper limit of the molecular weight range of virgin nylon (despite any precatory assertions in Yang et al. that deterioration of nylon should be avoided). Applicant submits that this evidence of unexpectedly different result, when considered with the prior art that the Examiner relies upon, constitutes a "secondary consideration" that leads one of ordinary skill in the art to the conclusion that Applicant's claimed invention would not have been obvious. *See In re Rinehart*, 180 USPQ 143 (CCPA 1976).

The previous Examiner entered and considered the declaration, stating:

Applicant's declaration although very insightful provides information about properties not previously disclosed or described in the specification. Applicant's declaration is not commensurate with the scope of the invention and it is not clear how such declaration would aid in process of overcoming prior art of record.

Office action dated April 7, 2005, p. 4. The current Examiner does not address the declaration in the most recent Office action. Applicant believes that, since new grounds of rejection are being asserted, it is necessary and appropriate for the Examiner to explain why the declaration does not overcome them.

With regard to the previous Examiner's comment that the declaration provides information about properties not previously disclosed or described in the specification, Applicant notes that the relevant test is not whether there is exact language support in the specification for the advantages shown in the Lees declaration, but rather whether the advantages shown in the Lees declaration inherently flow from a basic property or utility disclosed in the specification. *See In re Davies*, 177 USPQ 381, 384-85 (CCPA 1973); *In re Zenitz*, 142 USPQ 158, 160-61 (CCPA 1964) (Separation of hypotensive and tranquilizing activity and minimized hypotensive activity inherently flowed from disclosure in specification of use of compounds as tranquilizers); *Ex parte Sasajima*, 212 USPQ 103, 104 (Bd. Of App. 1980) (Undisclosed toxicity advantages inherently flow from disclosure of use as pharmaceutical); *In re Lorenz*, 142 USPQ 101, 104 (CCPA 1964) (There is no requirement that superiority over prior art be disclosed in the original application; it is enough if the basic property or utility is disclosed).

In this application, the basic utility and properties disclosed in the specification include the use of the recovered nylon as fiber due to its retention of molecular weight, described, *inter alia*, at page 3, lines 20-29. The specification describes that, with respect to nylon recycled from fibers that had been previously used in, e.g., floor coverings, one of ordinary skill in the art would expect that the molecular weight of the recycled nylon to be significantly decreased when compared to virgin nylon. This can occur as the result of a variety of causes, including the original high temperature extrusion process, exposure of the nylon to various environmental conditions, the extraction or dissolution process, and reextrusion of the recovered nylon into fiber.

The cumulative effect of this degradation generally renders post-consumer recycled nylon unsuitable for use in fiber, and thus results in a downcycling of the nylon. *See* the specification at p. 2, line 20 to p. 3, line 13. Appellant explains in this portion of the specification that the process of the invention allows the nylon present in floor coverings to be recycled without being downcycled, and that this results from the ability of the claimed process to avoid degrading the molecular weight of the nylon. *See* the specification at p. 3, lines 22-29; p. 5, line 25 to p. 6, line 7; and p. 6, line 27 to p. 7, line 3.

The Lees declaration reports results for testing of tenacity of fiber prepared according to the method claimed by Appellant. Fiber tenacity is strength per unit size of the fiber, and is a property frequently used to evaluate and describe fibers. Those of ordinary skill in the polymer or fiber art know that increasing the strength of a particular type of fiber often requires increasing the molecular orientation of the polymer molecules, and maintaining a high molecular weight of the polymer; short (low molecular weight polymer chains) are less able to orient properly and provide less contribution to the overall strength of the fiber. Tenacity, therefore, provides direct information about the strength properties of the fiber and its ability to perform in a particular application (e.g., as part of a carpet yarn). Tenacity also provides information about the molecular weight of the polymers making up the fiber, as higher molecular weight polymers tend to form fibers having higher tenacities.

Applicant respectfully submits that an improvement in tenacity for fiber produced by the claimed process inherently flows from Appellant's repeated disclosure in the specification that the claimed process is suitable for the recycling of

carpet fiber nylon into nylon suitable for re-extrusion into fibers. As a result, the unexpected improvement in properties should have been considered by the current Examiner in evaluating the propriety of her obviousness rejections. That the arguments presented above were previously presented in Applicant's Appeal Brief, but unanswered by the current Examiner in his Office action indicates that the current Examiner accepts the arguments as valid. Nevertheless, the current Examiner has not commented on the declaration in his Office action.

The previous Examiner has also indicated, without any detailed explanation, that the "declaration is not commensurate with the scope of the invention." Applicant has shown that, by operating within the claimed parameters, he is able to achieve a fiber tenacity higher than most, if not all, available virgin nylon products. The Yang et al. publication discloses that a change of 5% in molecular weight during the dissolution process alone is acceptable. One of ordinary skill in the art would reasonably expect that this 5% degradation, coupled with the degradation that occurs during the initial extrusion and use of the fiber, would result in a recycled nylon tenacity below that of virgin nylon, not at the upper limit of what is found for virgin nylon. It is not necessary that Applicant test every possible temperature, pressure, and dissolution time combination within the scope of the claims, as the previous Examiner appears to imply, since the specification makes clear that at temperatures below 155 °C and at high dissolution pressures, relative viscosity (an indicator of average molecular weight) increases as compared to higher dissolution temperature, lower dissolution pressure processes. See the specification at page 7, lines 17-29. As a result, the results provided in the Lees declaration can reasonably be extended to

show the unobviousness of the broader claimed range of temperatures. *See In re Clemens*, 206 USPQ 289 (CCPA 1980).

Applicant respectfully submits that the declaration of Lees shows that the use of low dissolution temperatures (below 155 °C) combined with high dissolution pressures (above the equilibrium vapor pressure of solvent at the dissolution temperature) for short dissolution times (less than 45 minutes) yields nylon that is not only suitable for extrusion and reuse as nylon fiber, but has a fiber tenacity higher than what would be obtained for most virgin nylon. Nowhere is this suggested in Yang et al. Such a result is completely unexpected, and is strong evidence of the nonobvious nature of the claimed invention.

B. Rejection Under 35 U.S.C. § 103(a)

At pages 7-8 of the Office action, the Examiner rejects claims 1-13 and 15-20 under 35 U.S.C. § 103(a) over Yang et al. Applicant respectfully traverses this rejection and requests its reconsideration and withdrawal.

Since the Examiner only addresses claim 13 in this rejection, Applicant incorporates by reference the comments made above with respect to claims 1-12 and 15-20. With respect to claim 13, the Examiner states:

Claim 13 further recites that the pressure head yields a pressure higher than the equilibrium vapor pressure of a solvent over Yang et al. However, Yang et al. teach employing a pressure vessel in order to get an elevated pressure, and thus a pressure vessel having a pressure head is an obvious modification, and choosing a temperature and dissolution time within the range disclosed by Yang et al. is a *prima facie* obviousness absent showing otherwise.

It would have been obvious to one skilled in the art the time of invention to utilize a pressure vessel having a pressure head in order to get an elevated pressure in Yang et al. since Yang et al. teach employing a pressure vessel and since a pressure vessel having a



pressure head is an obvious design modification since a solvent entering from a (pressure) head would have a higher contact with a nylon than that entering from the said or bottom of a pressure vessel.

Office action, page 7, line 16 to page 8, line 6. First, the Examiner's conclusion that "a solvent entering from a (pressure) head would have a higher contact with a nylon than that entering from the said or bottom of a pressure vessel" is incorrect and unsupported by any reference citation, scientific reasoning, or declaration under 37 C.F.R. § 1.104(d)(2). The contact time of the solvent and the nylon is not dictated by whether a pressure head is used, but by the flow rate of solvent through the dissolution vessel. Other than this piece of unsupported allegation, the Examiner's argument amounts to an assertion that "a pressure vessel having a pressure head" is obvious because it would have been an obvious modification of a pressure vessel to use a pressure head. In other words, the Examiner has again indulged in circular reasoning to reach his conclusion of obviousness.

Nowhere does Yang et al. teach or suggest the use of a pressure head to increase the dissolution pressure above that of that equilibrium vapor pressure of the solvent at the dissolution temperature. Nowhere does Yang et al. teach or suggest combining this increase in pressure with a decreased dissolution temperature and a decreased dissolution time. Nowhere does Yang et al. teach or suggest that this combination results in a surprising improvement of polymer properties. Nowhere does the Examiner provide a citation to a reference or a declaration of his own knowledge remedying these deficiencies in Yang et al. The Examiner has clearly failed to establish a *prima facie* case of obviousness with regard to any of the claims over Yang et al., and has failed to establish that any *prima facie* case is not rebutted


by the evidence in the Lees Declaration. Accordingly, the Examiner's rejection should be withdrawn.

#### CONCLUSION

The present claims are clear and definite, fully supported by an adequate and enabling written description, and define novel and nonobvious subject matter. They are in condition for immediate allowance. An early notification to that effect is earnestly solicited.

The Commissioner is hereby authorized to charge any deficiencies or credit any overpayment to Deposit Order Account No. 11-0855.

Respectfully submitted,

  
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